

REMARKS

Please reconsider the application in view of the above amendments and the following remarks. Applicant thanks the Examiner for carefully considering this application.

Disposition of Claims

Claims 1-3, 5-7, and 9-16 were pending. Claims 2-3, 6-7, 9, 11, and 13-16 have been canceled. Therefore, claims 1, 5, 10, and 12 are pending after the amendments. Claims 1 and 5 are independent claims. Claims 10 and 12 depend directly from claim 1 and 5, respectively.

Claim Amendments

Claim 1 has been amended to include limitations from claims 2 and 3. Claim 5 has been amended to include limitations from claims 6 and 7. Claims 10 and 12 have been amended to correct typographic errors. No new matter is introduced by these amendments.

Claim Objections

Claims 10 and 12 were objected to for typographic errors.

These claims have been amended in accordance with Examiner's suggestions. Therefore, withdrawal of this objection is respectfully requested.

Rejection(s) under 35 U.S.C. §103(a)

- (A) Claims 1-3 and 5-7 were rejected under 35 U.S.C. §103(a) as being unpatentable over Aurelie et al. (WO 03/048225), where Treacher et al. (US 2004/0260090) (hereafter

“Treacher”) is used as the English equivalent, in view of Son et al. (US 2003/0094595) (hereafter “Son”) and applicant’s admitted prior art (hereafter “AAPA”). Claims 2-3, 6-7, 9, and 11 have been canceled, rendering this rejection moot with respect to these claims. Claims 1 and 5 have been amended. To the extent that this rejection may still apply to the amended claims, this rejection is respectfully traversed.

To establish a prima facie case of obviousness under 35 U.S.C. §103(a), a prior art reference must teach or suggest all the claim limitations. *In re Royka*, 490 F.2d 981, 180 USPQ (C.C.P.A., 1074).

The present invention relates to electric transfer light emitting polymers, in which the chlorine content (Cl) and the sum total (Σ M) of metal elements (including at least one of sodium, nickel and palladium) satisfy a relation of: $\Sigma M < Cl$, wherein the chlorine content is 50 ppm or less.

Specifically, the amended independent claims 1 and 5 each require, *inter alia*, “wherein a chlorine content (Cl) and a sum total (Σ M) of metal elements included in the polymer satisfy equation 1: $\Sigma M < Cl \dots (1)$, wherein the metal elements comprise at least one of sodium, nickel and palladium, wherein the chlorine content is 50 ppm or less.”

The Examiner cites Treacher as teaching the same type of polymers. However, the Examiner also acknowledges that Treacher does not teach the amount of the impurities in the polymer and is silent in the presence of Cl (OA, p. 5, ¶ 15) and that Son is silent on the types of impurities (OA, p. 5, ¶ 16). The Examiner relies on AAPA for the teaching of various impurities

in such polymers. (OA, p. 6, ¶ 17).

The Examiner cites Son as teaching that the polymer should contain as little as the impurities as possible. (OA, p. 5, ¶ 16). However, this simple “rule” is not the only criterion, and sometimes getting to as little impurity as possible may not be economically practical.

The inventors of the present invention have *unexpectedly* found that in addition to low impurities, the sum of metal impurities (especially, sodium, nickel, and palladium) should be less than the total chloride impurity content. That is, when $\Sigma M < Cl$ and the chlorine content is 50 ppm or less, the efficiency and performance of the polymers are improved.

As shown in Tables 1-3 in the specification, the top three entries in each table have significantly better efficiencies than the bottom three entries. There is an apparent jump in efficiency going from the bottom three entries to the top three entries (i.e., from Sample 4 to Sample 3, from Sample 10 to Sample 9, and from Sample 16 to Sample 15). The top three entries in each table all meet the requirements: $\Sigma M < Cl$ and the chlorine content is 50 ppm or less, while the bottom three entries in each table do not.

None of these prior art references teach the unique relationship of $\Sigma M < Cl$, wherein the metal elements comprise at least one of sodium, nickel, and palladium and wherein the chlorine content is 50 ppm or less, as required by the amended claims 1 and 5.

Because Treacher, Son, and APAA in combination fail to teach or suggest at least one limitation of the amended claims 1 and 5, the amended claims 1 and 5 are patentable over Treacher in view of Son and APAA. Accordingly, withdrawal of this rejection is respectfully

requested.

- (B) Claims 1-3, 5-7, and 9-12 were rejected under 35 U.S.C. §103(a) as being unpatentable over Miteva et al. (Adv. Mater. 2001, 13, 555-570) (hereafter "Miteva") in view of Aurelie et al. (WO 03/048225), where Treacher et al. (US 2004/0260090) (hereafter "Treacher") is used as the English equivalent, Son et al. (US 2003/0094595) (hereafter "Son") and applicant's admitted prior art (hereafter "AAPA"). Claims 2-3, 6-7, 9, and 11 have been canceled, rendering this rejection moot with respect to these claims. Claims 1, 5, 10, and 12 have been amended. To the extent that this rejection may still apply to the amended claims, this rejection is respectfully traversed.

Miteva teaches end caps of fluorene polymers. However, Miteva does not teach removal of impurities from fluorene polymers, nor does Miteva teach the unique relationship between the metal impurity and chlorine content, as required by the amended claims 1 and 5. Thus, Miteva fails to teach or suggest that which is missing in Treacher, Son, and APAA.

Because a combination of Miteva, Treacher, Son, and APAA fails to teach or suggest at least one limitation of the amended claims 1 and 5, the amended claims 1 and 5 are patentable over Miteva, in view of Treacher, Son, and APAA. Dependent claims 10 and 12 should also be patentable for at least the same reasons. Accordingly, withdrawal of this rejection is respectfully requested.

Conclusion

Applicant believes this reply is fully responsive to all outstanding issues and places this application in condition for allowance. If this belief is incorrect, or other issues arise, the Examiner is encouraged to contact the undersigned or his associates at the telephone number listed below. Please apply any charges not covered, or any credits, to Deposit Account 50-0591 (Reference Number 17155/005001).

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Respectfully submitted,

By 

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